DUO'PULSE
Modular electric pump

User and Maintenance Manual

Certification	CE

Manual compiled in accordance with Directive
C2116IE – WK 50/09
CE 98/37 Appendix I, paragraph 1.7.4

Pour obtenir ce manuel d'utilisation en espagnol, veuillez consulter notre site Internet : www.ntn-snr.com
Um unsere deutsche Gebrauchsanweisung zu erhalten, besuchen Sie uns auf unserer Homepage: www.ntn-snr.com
Para conseguir este libro de instrucciones en español, consultar nuestro sitio Internet : www.ntn-snr.com
Per questo manuale in italiano, si prega de visitare il nostro sito : www.ntn-snr.com

1. CONTENTS

1.Contents	p.2	10.Maintenance procedures	p.18
2.Introduction	p.2	11.Disposal	p.18
3.General description	p.2	12.Information about ordering	p.18
4.Identification of the pump	p.3	13.Dimensions	p.22
5.Technical characteristics	p.3	14.Handling and transport	p.22
6.Pump components	p.5	15.Precautions for use	p.22
7.Unpacking and installation	p.10	16.Contraindications for use	p.22
8.Instructions for use	p.10	17.Guarantee	p.23
9.Problems and solutions	p.16	18. Declaration of conformity	p.24

2. INTRODUCTION

This user and maintenance manual refers to the DUO'PULSE air/oil lubrication system.
This manual should be conserved in such a way that it remains undamaged over time and is readily available to personnel needing to consult it.
The manufacturer reserves the right to update the product and/or the user and maintenance manual without the obligation to revise previous versions.Further copies of this manual, updates or clarifications can be obtained by directly contacting Experts & Tools at NTN-SNR Roulements, or to consult our web site at www.ntn-snr.com.
The use of the equipment referred to in this manual must be entrusted to qualified personnel with a basic knowledge of mechanics, hydraulics and electrical systems.
It is the responsibility of the installer to use tubing suitable for the system; the use of inadequate tubing can cause problems with the pump, injury to persons and create pollution.
Loosening of connections can cause serious safety problems; carry out a check before and after installation and, if necessary retighten them.
Never exceed the maximum working pressure values permitted for the panel and the components connected to it.
Before any maintenance or cleaning operation disconnect the power supply, close off the airsupply and discharge the pressure from inside the equipment and the tubing connected to it.
Do not subject the panel, the connections, the tubing or parts under pressure to violent impacts; damaged tubing or connections are dangerous and should be immediately replaced.
After long periods of inactivity check air tightness of all parts subjected to pressure.
Personnel must use personal protection equipment, clothing and tools adequate for the location and the use of the panel both during its operation and during maintenance operations.
The panel, and any accessories mounted on it, should be carefully checked immediately on receipt and in the event of any discrepancy or complaint the NTN-SNR Roulements Sales department should be contacted without delay.
NTN-SNR Roulements declines to accept any responsibility for injuries to persons or damage to property in the event of the non-observance of the information presented in this manual.
Any modification to component parts of the system or the different destination of use of this system or its parts without prior written authorization from NTN-SNR Roulements will absolve the latter from any responsibility for injury to persons and/or damage to property and will release them from all obligations arising from the guarantee.

3. GENERAL DESCRIPTION

The DUO'PULSE lubrication pump may be adapted to many uses without making any mechanical changes even after it has been installed. In fact, the pressure, quantity of lubricant delivered, actual type of lubricant or type of distribution can be altered.
Its design is essentially based on the following modules:
•Electric motor
•Pump body with integrated reducer
•Two pumping elements
•Reservoir
•Valves and outlet unit (inverter, pressure adjustment valve, etc.).

There is only one pumping structure for all versions, with the dual pumping element constituting the essential module.
The pump unit possesses one single output, because the deliveries from the two pumping elements flow into one manifold unit.
The pump has an electrical controller which is able to effect inversion and perform the programmed cycles.
The DUO'PULSE electric pump is fully protected against the external environment and can operate without difficulty under the most severe environmental conditions.

DUO'PULSE 100 kg Picture 1

DUO'PULSE 30 kg Picture 2

4. IDENTIFICATION OF THE PUMP

On the front part of the pump tank,a plate indicates the product code, the supply voltage and the basic characteristics.

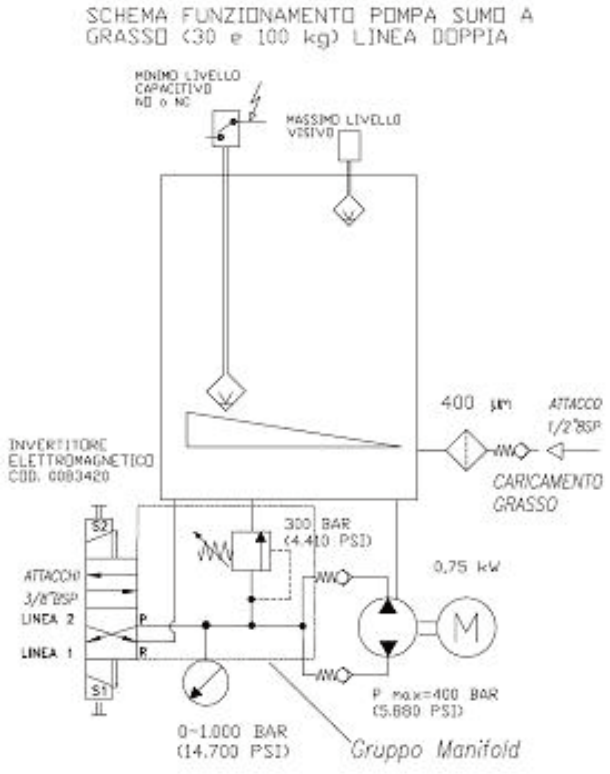
5. TECHNICAL CHARACTERISTICS

Max. pressure	400 bars
Outlet delivery	400 cm3 / min (24 cu. in/min) (2 x 200 cm3 (12 cu. in) for each pump module)
Working temperature	From - 5° C to + 50° C (from 23° F to +122° F)
Working humidity	90% max
	Mineral oil lubricants
Viscosity at working temperature	Min. 32 cSt
	Grease lubricants
Grade	NGLI 2 Max.
Protection level	IP 55
Electric motor	Three phase Power 0.75kW Protection IP55 class B Voltage: 230-400 VAC ± 5% 50 Hz 240-440VAC ± 5% 60 Hz S1 continuous service.

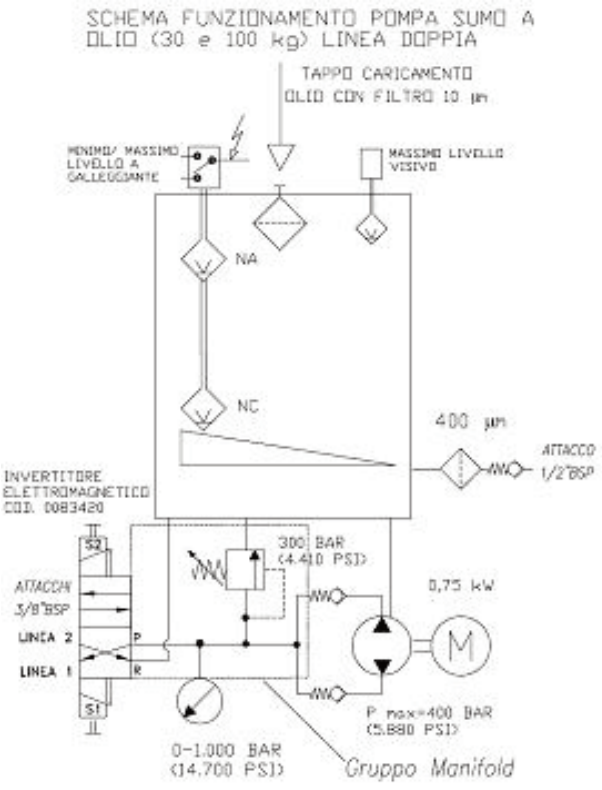
N.B.: do not supply the machine with different voltages and pressures from those indicated on the plate.

5.1 HYDRAULIC FUNCTION DIAGRAM

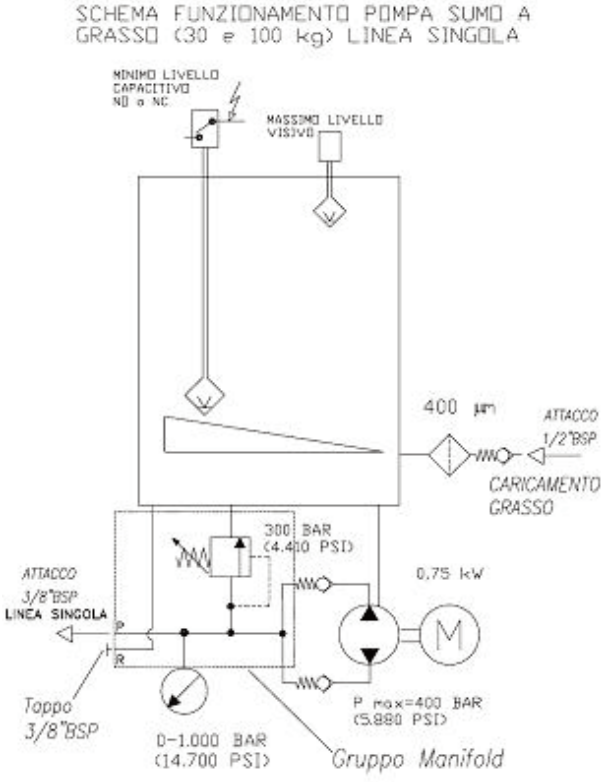
Standard grease pump (dual line)



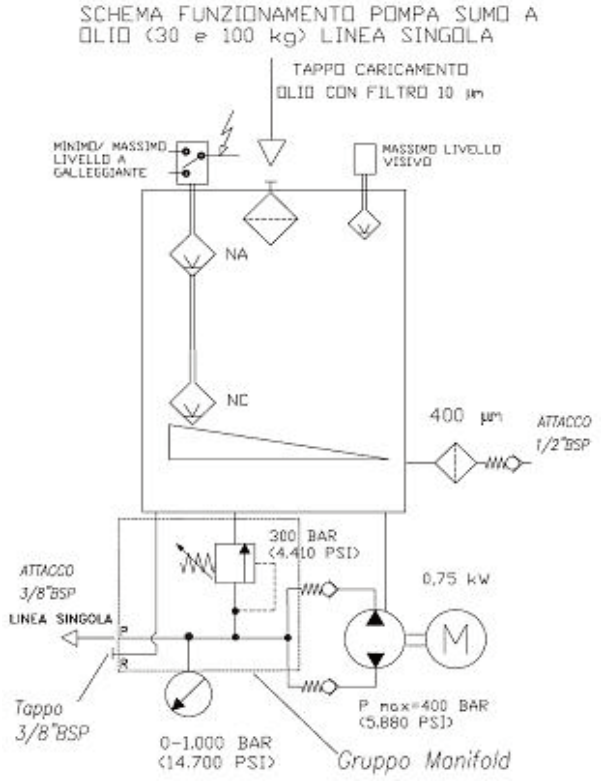
Standard oil pump (dual line)



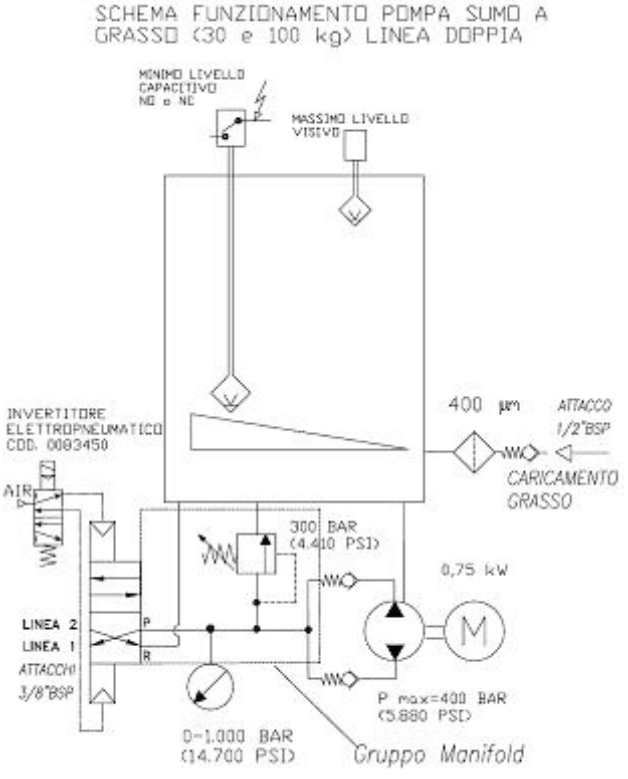
Single outlet grease pump (option)



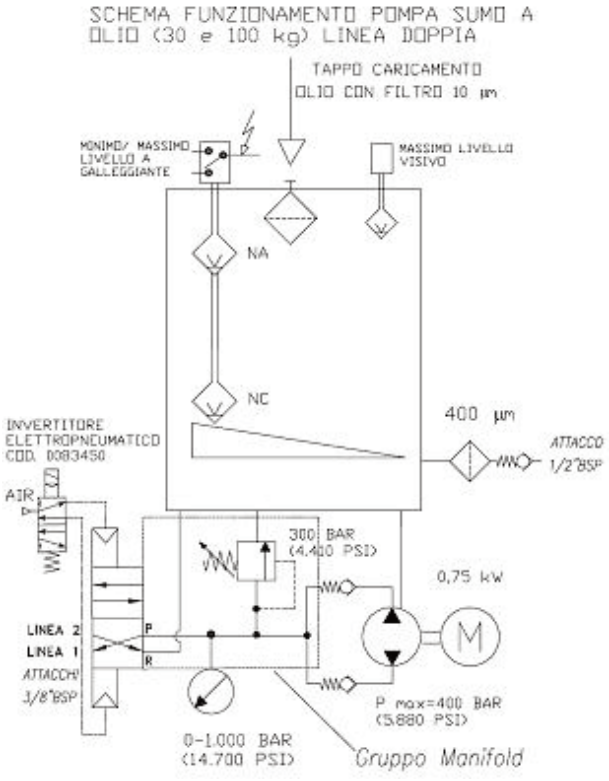
Single outlet oil pump (option)



Grease pump (options: dual line, electropneumatic inverter)



Oil pump (options: dual line, electropneumatic inverter).



6. PUMP COMPONENTS

6.1 FIXED DELIVERY PUMPING ELEMENTS

The pump has two standard pumping elements (200 cm^3/ min for each pumping element). A piston slides inside the body of the pumping element coupled to the latter by a lapping process. The seal between the piston and the pumping body is of dry type, with no gasket provided between the two. The pumping element retention valve has a tapered seal This solution is able to guarantee an optimum seal for the system at high operating pressures (max. pressure 400 bar). The pumping elements are assembled on the manifold unit with a threaded attachment, which facilitates its assembly/ dismantling.

6.2 ENDLESS SCREW / WORM WHEEL UNIT

The pump has endless screw-worm wheel working kinematics with a transmission ratio of 1/40. The screw is made from special steel with high mechanical resistance. To guarantee high resistance to wear, the screw has been subjected to Tenifer wear-resistant treatment. The screw is supported by angular contact ball bearings, duly preloaded, to reduce working clearance. The worm wheel is made of bronze alloy for gear systems, particularly suitable for making the pump run quietly. The worm wheel shaft is made of special high resistance steel which gives the pump better reliability and durability.

6.3 INVERTORS

The standard pump is prepared for dual line function, with an electromagnetically controlled inverter as standard. The inverter can be replaced, without disconnecting the two line pipes (of an interchangeable type). This is able to reduce maintenance times and the relating installation shutdown.

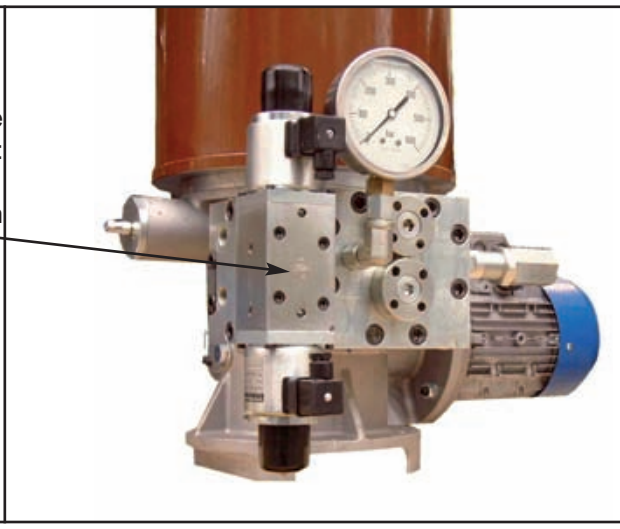
GENERAL NOTE FOR ALL INVERTERS: It is advisable to plan a delay in the de-energizing of the electromagnets of 2 - 5 sec. to allow complete inversion in relation to the closing time of the pressure gauge at the end of the line.

Exchanging the inverter without disconnecting the line pipes. A solution of this type offers the following advantages:

•Ease of assembly and dismantling (only the 4 front Allen screws need to be loosened and tightened);

•Short replacement time;

•Minimum installation shutdown time.



Spare parts			
Code	Description	Current (A)	Power (W)
	Electrovalve 24V DC	7	170
	Electrovalve 110V AC 50/60 Hz	2	206
	Electrovalve 230V AC 50/60 Hz	1	176
	Seal kit		

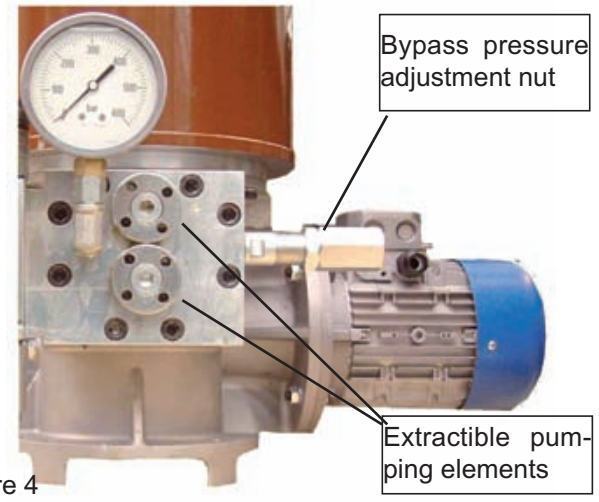
Spare electrovalves	
Code	Description
	Solenoid 24V DC
	Solenoid 24V AC 50/60 Hz
	Solenoid 110V AC 50/60 Hz
	Solenoid 230V AC 50/60 Hz

6.4 PRESSURE CONTROL VALVE MOUNTED ON THE PUMP

The pump has a pressure control valve, mounted on the manifold unit on the right side of the pumping elements. The valve can be easily dismantled for inspection if required. It is calibrated by turning the bypass pressure adjustment nut:

- clockwise (increase of pressure)
- anticlockwise (decrease of pressure)

Once the bypass has been calibrated, the position of the pressure adjustment nut is locked using a lock nut. It is important to bear in mind that line inversion is controlled by closing the contacts of the pressure switch. Adjusting the pressure switch provides an operating pressure which is lower than the maximum pressure controlled by this valve.



Picture 4

Code	Descripition
	Pressure 100 to 450 bar (1470 ÷ 6615psi)
	Pressure 50 to 200 bar (735÷ 2940 psi) on request

6.5 PUMPING ELEMENTS WITH FIXED AND VARIABLE FLOW

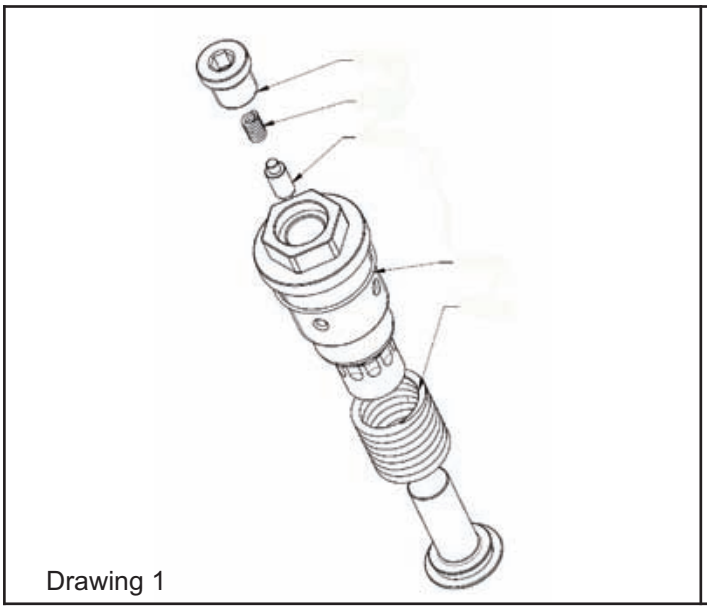
The standard pump has two pumping elements with fixed flow (Image 1). On request it is possible to have a solution with variable flow (Image 2). The pump can offer variable flow by replacing a fixed flow pumping element with a variable flow one.

Ref.	Code	Description
Picture 1		Pumping element with variable flow 100- 200 cm3/min
Picture 2		Pumping element with fixed flow 200 cm3/min

The main parts of the pumping element with variable flow are:
•External body of the pumping element assembled with seal threading on the manifold group;
•Internal body of the pumping element equipped with flow adjustment with threaded screws;
•Piston;
•Non-return valve with tapered cone seal system;
•Spring which guarantees contact between the piston and the excentric gear.

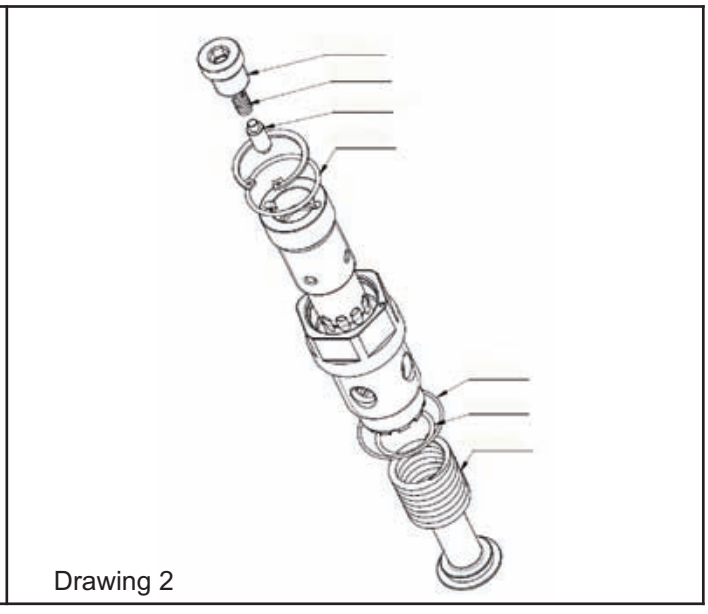
Ref.	Code	Description	Code	Description
Picture 1		Fixed pumping element unit		OR 2187 gasket in polyurethane CHPU95
				Stop valve cap
				Tapered spring
				Valve cone
Picture 2		Variable pumping element unit		Gasket OR 2187 in polyurethane CHPU95
				Gasket OR 3156 in polyurethane CHPU95
				Gasket OR 3118 in polyurethane CHPU95
				Stop valve cap
				Tapered spring
				Valve cone

Fixed flow pumping element



Drawing 1

Variable flow pumping element



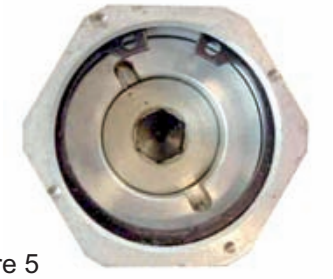
Drawing 2

6.6 ADJUSTMENT OF PUMPING ELEMENT DELIVERY.

Flow is adjusted by unscrewing (reducing flow) or tightening (increasing flow) the internal pumping element.Each complete turn corresponds to an 11.5% change in delivery. There are two on the fixed and mobile pumping element bodies (Picture 5) which allow identification of rotation at every ¼ turn (90°). The internal pumping element possesses a threaded adjustment of M36x2: each complete turn corresponds to an adjustment of the pumping element stroke of 2 mm. X is the reference height obtained with calibration, between the exterior of the fixed pumping element and the exterior of the internal pumping element. Y is the actual displacement of the internal pumping element (Y=13-X).

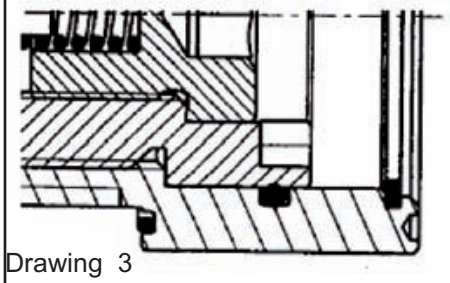
X height measured mm	Y= 13-X pumping element adjustment stroke	% variation of delivery per pumping element	Actual stroke of pumping element mm	Effective pumping element delivery Cm3/ min
13	0	0	17.5	200
11	2	11.5	15.5	176
9	4	23	13.5	154
7	6	34.5	11.5	132
5	8	46	9.5	108

N.B:. Flow values are valid in the absence of outgoing counterpressure.



Picture 5

Picture 6



Drawing 3

6.7 MAXIMUM AND MINIMUM GREASE LEVEL INDICATORS

Standard grease pumps indicate two types of level:

•Minimum capacitive level;
•Maximum visual level (float).

Code	Description
	Maximum visual level kit (float)
	Minimum capacitive level kit for 30kg tank (68.1 lb.)
	Minimum capacitive level kit for 100kg tank (100.02 kg.)
	Capacitive probe

6.7.1 Minimum capacitive level

The minimum level is controlled by a capacitive probe, positioned on the end of a pipe mounted on the tank cover. The capacitive probe is normally closed. When it reaches the minimum level the probe indicates a lack of lubricant. To make the solution valid for NLGI2 grease as well, the capacitive probe interfaces with the scraper whose function is to clean the lower face of the grease probe. If the capacitive probe is replaced then it must be recalibrated (see calibration procedure).
The minimum level contact is indicated by a light signal on the control panel. In addition it can control to automatically refill the tank.

6.7.2. Maximum visual level (floating)

The phase for loading the lubricant into the tank is carried out by the operator, with an appropriate pump. Once the maximum level of lubricant has been reached, a small floating rod indicates that the tank is full.

6.8 INDICATORS OF MINIMUM AND MAXIMUM OIL LEVEL.
Standard oil pumps indicate two types of level:

•Minimum and maximum level float;
•Maximum visual level (float).

Code	Description
	Maximum visual level kit (float)
	Maximum visual level float
	Level float kit for 30 kg tanks (68.1 lb.) (minimum and maximum level)
	Level float kit for 100 kg tanks (68.1 lb.) (minimum and maximum level)

6.8.1 Minimum and maximum level float
A probe rod with dual float mounted on the pump cover provides a reading of the minimum oil level (reserve) and the maximum level (which allows the automatic refilling of the tank to be stopped).
The minimum level contact is indicated by a light signal on the control panel. In addition it can control to automatically refill the tank.

6.8.2. Maximum visual level (floating)
See point 6.7.2.

6.7 STIRRING PADDLE FOR GREASE AND OIL (STANDARD PERFORMANCE)
Tanks are provided with a capacity of 30 and 100 kg. (22 – 66.1 – 220.4 lb) : two for oil and two for grease.
The tanks have a stirring paddle and scraper as standard, and they must not be dismantled when they are being assembled and replaced. Under the stirring paddle a galvanized steel mesh with 0.5 mm holes (0.02 in.) is provided as standard. In this way the pump is protected from any foreign bodies which might be inadvertently present during the tank refilling process.

6.8 PRESSURE GAUGE
The pressure gauge is of the glycerin filled type, so it is protected from any pressure leaks which might damage its functioning. It is mounted directly in the manifold block (positioned on the front of the pump).

Code	Description
	1000 bar (0 -14.700 psi)

6.9 ELECTRICAL CONTROL PANEL

The electrical control panel has been designed to provide a complete system complete with all the controls necessary for automatic functioning controlled by safety signals from centralized lubrication installations. The primary voltage is 400 VAC at 50 Hz (other voltages on request).

Type of probe	Type of inverter	Voltage V	Code Electrical apparatus	Code Electric diagram
CAPACITIVE PROBE	electromagnetic	24 VDC		
		110 VAC		
		220 VAC		
	electropneumatic	24 VDC		
		110 VAC		
		220 VAC		
LASER PROBE	electromagnetic	24 VDC		
		110 VAC		
		220 VAC		
	electropneumatic	24 VDC		
		110 VDC		
		220 VDC		

7. UNPACKING AND INSTALLATION

WARNING: The unit is only to be opened and repaired by skilled technicians.

No pump assembly operations are requested. The pump is fixed on a metal plate, which allows safe handling using a forklift. This plate has been equipped with 4 holes of Ø 14 mm suitable for fixing on the floor. Provide adequate space (as shown on the installation diagram) to avoid abnormal posture or possible impact. Then, as described previously, the pump must be connected hydraulically to the machine and then connected to the control panel.

8. INSTRUCTIONS FOR USE

8.1 GOING INTO OPERATION

Damage to the supply cable and housing may involve contact with high voltage live parts and consequently fatal danger:

•Check the integrity of the supply cable and the unit prior to use;
•If the supply cable or the unit is damaged, do not start up the system!
•Replace the damaged supply cable with a new one;
•The unit can be opened and repaired only by skilled technicians;
•In order to prevent the danger of electrocution due to direct or indirect contact with live parts the electric supply line must be adequately protected by an appropriate magnetothermal differential 30mA circuit breaker max response time of 1 second;
•The switching capacity must be ? 10 kA and rated current In = 6 A.
•The pump must not be used when submerged in fluids or in a particularly aggressive or explosive/inflammable atmosphere unless prepared in advance for this purpose by the supplier;
•To fix the pump correctly check the pitch dimensions shown in the figures in chapter 12;
•Use safety gloves and goggles as indicated in the safety sheet for the lubrication oil;
•Do NOT use lubricants which are aggressive for NBR gaskets, and if in doubt consult NTN-SNR Bearings which will supply a detailed list of the recommended oils;
•Do not ignore dangers to health and comply with health and safety regulations;
•Warning! All the electric components must be grounded correctly. This applies to both the electric components, and to the control devices. To this end make sure that the earth wire is connected correctly. For safety reasons the ground conductor must be approximately 100 mm longer than the phase conductors. If the cable is accidentally removed, the earth terminal must be the last one to be removed.

8.2 ACTION TO BE TAKEN BEFORE START-UP.

•Check the integrity of the pump.
•Refill the tank with suitable lubricant.
•Check that the pump is at working temperature and that there are no air bubbles in the pipes.
•Check that the electric connection has been carried out correctly.

8.3 USE.

•check the data settings.
•press the start button on the machine to which the DUO'PULSE pump is connected.
•check pump start-up.
•check that the machine is adequately lubricated (if there are still some doubts about its correct functioning you can contact the NTN-SNR Experts & Tools and request a test procedure).
•check that the direction of rotation of the electric motor is the one indicated by the indicator arrow, positioned on the protective housing of the motor fan;
•check that the hydraulic connection is correct.

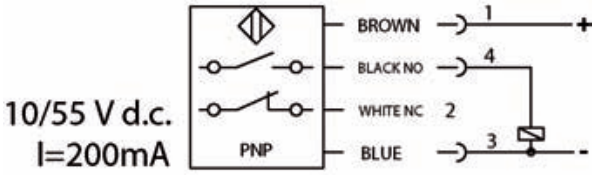
8.4 ADJUSTMENT/ CALIBRATION OF LEVEL PROBES

8.4.1 Pressure

It is possible to adjust working pressure by rotating the bypass screw clockwise to increase pressure or anticlockwise to reduce pressure. During this operation pay attention to the pressure gauge positioned on the edge of the pump.

8.4.2 Procedure for calibrating the capacitive probe
Before being assembled the capacitive probe must be calibrated in accordance with the following sequence:
1.Connect the sensor electrically;
2.Immerse the sensor in the lubricant, down to half of its depth;
3.Remove the sensor from the lubricant until it skims the surface of the lubricant;
4.At this point there can be two possible types of operation:
• The sensor status does not change: its sensitivity must be reduced (by acting on the screws for adjusting sensor sensitivity) until its state of excitation is reached
• If its status changes, the sensor already possesses the correct sensitivity
5 After checking that the sensor has been correctly read, the sensor reading must be repeated at least three times
6.Tighten the capacitive probe on the probe carrier rod, complying with the following assembly height:
• 450 mm (from below the cover up to the lower surface of the sensor) for a 30 kg tank
• 900 mm (from below the cover up to the lower surface of the sensor) for a 100 kg tank

Operating instructions for the capacitive probe (model SC18M-C5 PNP NO + NC)

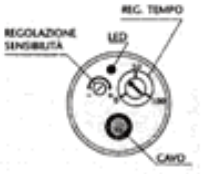


Drawing 4

General information about operation C - A - R

Sensor operating under C for DC (4 wires)

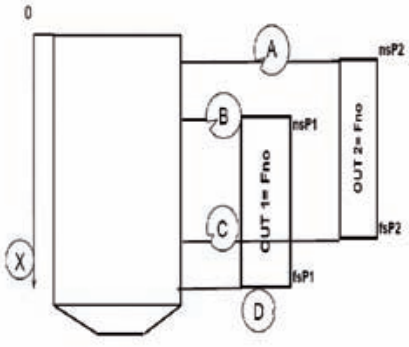
They are sensors which are amplified in DC and which incorporate, in addition to the oscillator, the outlet amplifier. They are supplied with 4 wires as in the NPN or PNP versions. In this operation the sensors offer as standard protection against permanent short circuit of the load, absolute safety against inversion of polarity and protection from the peaks produced by disconnecting inductive loads. They can be supplied together with model ALNC – ALTP feeders. They are compatible with programmable controller inputs.



Drawing 5

8.4.3 Procedure for calibrating the laser probe
The laser probe has a programming display. It is possible to operate in analogue mode (with signal from 4 to 20 mA) or in digital mode (two outputs and four thresholds).
Table showing the calibration parameters for the laser probe, for 30 and 100 kg tank.

Drawing 6



Laser probe calibration

				30 kg tank		100 kg tank	
Pos.	Level	Output signal	Set-up	Height X [mm]	Quantity of grease [kg]	Height X [mm]	Quantity of grease [kg]
A	Maximum absolute level	OUT 2= Fno	nsP2	200	22	200	81
C	Minimum level		fsP2	370	11	700	25
B	Maximum level	OUT 1= Fno	nsP1	230	20	230	78
D	Minimum absolute level		fsP1	420	8	800	14

N.B.: In the 30 kg pump tank at minimum level there is still a reserve of 7 kg.
In the 100 kg pump tank at minimum level there is still a reserve of 15 kg

Operating instructions for the laser probe model O1D100

Uso conforme

Il sensore ottico di distanza
- misura distanze da 0,2 a 10 m,
- visualizza il valore di misura sul display a 10 segmenti,
- genera 2 segnali di uscita conformemente alla funzione impostata dell'uscita.
- O1D100: certificazione 21 CFR PART 1040

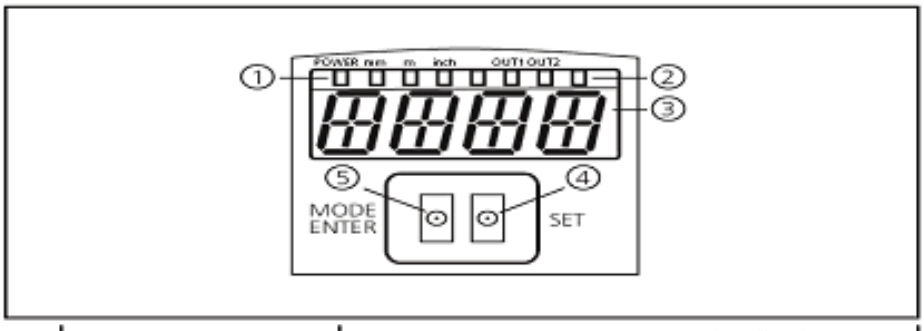
Elementi di comando e di indicazione

①	4 x LED verdi	LED acceso = power e unità di misura impostata (mm, m, inch)
②	4 x LED gialli (due non occupati)	Indicazione dello stato di commutazione; accesi se la rispettiva uscita è collegata.
③	Display alfanumerico a 4 posizioni	Indicazione della distanza misurata, dei parametri e dei valori del parametro.
④	Tasto di programmazione Set	Impostazione dei valori dei parametri (continua tenendo premuto; incrementale premendo brevemente).
⑤	Tasto di programmazione Mode / Enter	Selezione dei parametri e conferma dei valori del parametro.

Uso conforme

Il sensore ottico di distanza
- misura distanze da 0,2 a 10 m,
- visualizza il valore di misura sul display a 10 segmenti,
- genera 2 segnali di uscita conformemente alla funzione impostata dell'uscita.
- O1D100: certificazione 21 CFR PART 1040

Elementi di comando e di indicazione



①	4 x LED verdi	LED acceso = power e unità di misura impostata (mm, m, inch)
②	4 x LED gialli (due non occupati)	Indicazione dello stato di commutazione; accesi se la rispettiva uscita è collegata.
③	Display alfanumerico a 4 posizioni	Indicazione della distanza misurata, dei parametri e dei valori del parametro.
④	Tasto di programmazione Set	Impostazione dei valori dei parametri (continua tenendo premuto; incrementale premendo brevemente).
⑤	Tasto di programmazione Mode / Enter	Selezione dei parametri e conferma dei valori del parametro.

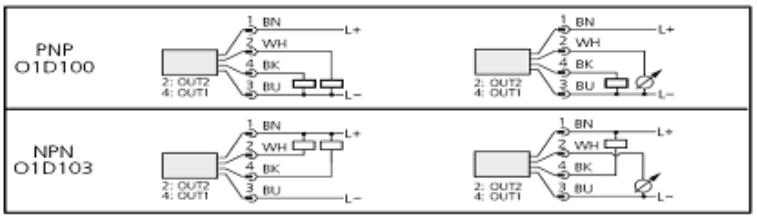
Funzioni dell'uscita

	Uscita 1	Uscita 2
Funzione di commutazione: uscita 1 / 2 rispettivamente commutabile p o n; funzione impostabile in modo separato per ogni uscita	Funzione di isteresi / NO (**Hno**)	
	Funzione di isteresi / NC (**Hnc**)	
	Funzione di finestra / NO (**Fno**)	
	Funzione di finestra / NC (**Fnc**)	
Funzione analogica: solo uscita 2	—	**I**: 4 ... 20 mA
		U: 0 ... 10 V

Collegamento elettrico

L'apparecchio deve essere installato soltanto da un tecnico elettronico.
Osservate le disposizioni nazionali ed internazionali per l'installazione di impianti di elettrotecnica.
Alimentazione di tensione secondo EN50178, SELV, PELV.
O1D100: cULus, Supply Class 2

Disinserite l'impianto dalla tensione e collegate l'apparecchio come descritto di seguito.



Colori dei fili dei connettori femmina ifm:
1 = BN (marrone), 2 = WH (bianco), 3 = BU (blu), 4 = BK (nero).

ATTENZIONE: se l'uscita 2 viene collegata ad una scheda dell'ingresso analogico, l'uscita deve essere precedentemente parametrizzata (**OU2= I** oppure **OU2 = U**). In caso contrario è possibile che la scheda dell'ingresso venga distrutta.

Instructions for calibrating the Laser Probe O1D100

Rotate the wording on the Display by 180°.
1.Press the MODE ENTER key 7 times: EF. appears on the Display.
2.Press the SET key.
3.Press the MODE ENTER key 5 times: diS. appears on the Display.
4.Press the SET key. d3. appears on the Display.
5.Keep the SET button pressed down for 5 sec.
6.When the wording on the Display no longer flashes, press SET once.
7.rd1. appears on the Display.
8.Press MODE ENTER once.
9.Check that the Display wording has rotated by 180°.

Calibrate outlet 1 (OUT 1) operating with window nsP1 (B) & fsP1 (D) (see Calibration table for Laser probe)
1.Press the MODE ENTER key once: OU1 appears on the Display.
2.Keep the SET button pressed down for 5 sec.
3.When the wording on the Display no longer flashes, press SET twice until Fno appears on the Display.
4.Press the MODE ENTER key once: nsP1 appears on the Display.
5.Keep the SET button pressed down for 5 sec.
6.When the wording on the Display no longer flashes, press SET once.
7.The value of the height read appears on the Display.
8.Press the SET button until the desired height appears.
9.Press the MODE ENTER button once and the height set is memorised.
10.Press the MODE ENTER key once: fsP1 appears on the Display.
11.Repeat the previous points from N° 5 to N° 9.

Calibrate outlet 2 (OUT 2) operating with window nsP2 (A) & fsP2 (C) (see Calibration table for Laser probe)
1.Press the MODE ENTER key once: OU2 appears on the Display.
2.Keep the SET button pressed down for 5 sec.
3.When the wording on the Display no longer flashes, press SET 4 times until Fno appears on the Display.
4.Press the MODE ENTER key once: nsP2 appears on the Display.
5.Keep the SET button pressed down for 5 sec.
6.When the wording on the Display no longer flashes, press SET once.

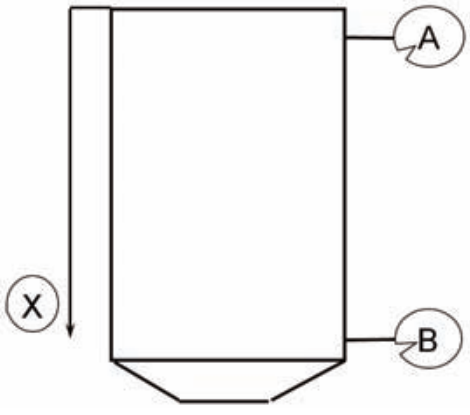
7.The value of the height read appears on the Display.
8.Press the SET button until the desired height appears.
9.Press the MODE ENTER button once and the height set is memorised.
10.Press the MODE ENTER key once: fsP2 appears on the Display.
11.Repeat the previous points from N° 5 to N° 9.

8.4.4 Procedure for calibrating the ultrasound probe model ZWS-70/CI/QS (code 3289173)

Before being assembled the probe must be calibrated in accordance with the following sequence:
1 Electrically connect the sensor (following the electric diagram shown below);
2.Keep the sensor button pressed down until the two LED (green and yellow lights) flash together;
3.Position it in front of the minimum absolute level to be read, entering the height by releasing the button (the two LEDs display a fixed light);
4.Press the button for 3 or 4 seconds (the probe has acquired the Minimum absolute level);
5.Keep the sensor button pressed down until the two LED (green and yellow lights) flash together;
6.Position it in front of the maximum absolute level to be read, entering the height by releasing the button (the two LEDs have a fixed light);
7.Press the button for 3 or 4 seconds (the probe has acquired the Maximum absolute level);
8.In this way the sensor is calibrated.

N.B.: Green Led on indicates that the probe is electrically supplied. Yellow Led on indicates operating mode for reading.
Table with the calibration parameters for the ultrasound probe, for 30 and 100 kg tanks.

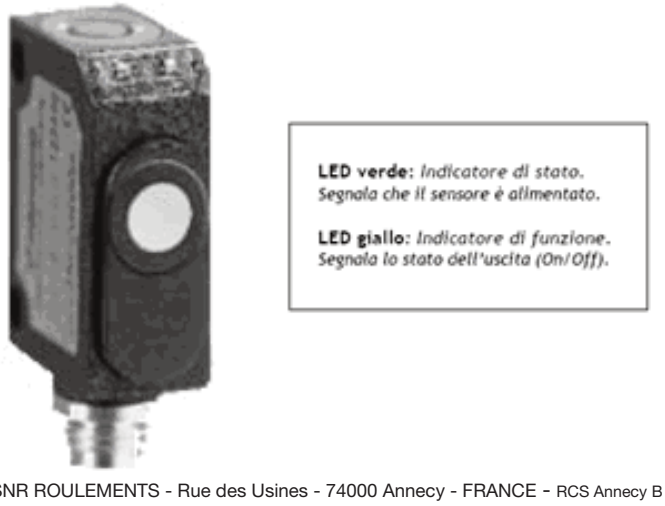
Drawing 7



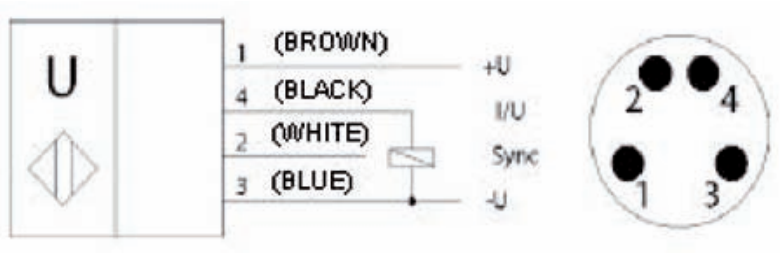
Calibration of ultrasound probe						
Pos.			30 kg tank		100 kg tank	
	Level	Output signal	Height X [mm]	Quantity of grease [kg]	Height X [mm]	Quantity of grease [kg]
A	Maximum absolute level	Thresdol d1	50	26	50	95
B	Minimum absolute level	Thresdol 2	420	0	800	0

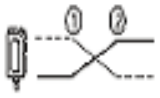
N.B.: In the 30 kg pump tank at the minimum level there is still a reserve of 7 kg.
In the 100 kg pump tank at the minimum level there is still a reserve of 15 kg.

Picture 7


LED verde: Indicatore di stato.
Segnala che il sensore è alimentato.
LED giallo: Indicatore di funzione.
Segnala lo stato dell'uscita (On/Off).

Drawing 8





Window setting:

START

Place the object on the threshold (1)

During the operational phase, the sensor detects only objects between this threshold and (2)

Press the button for about 3 seconds until the LED blink simultaneously.
(*The LED flashes*)

Place the object on the threshold (2)

During the operational phase, the sensor detects only objects between this threshold and (1)

Press the button for about 1 sec., then release it.
(*The sensor returns to operation*)

END

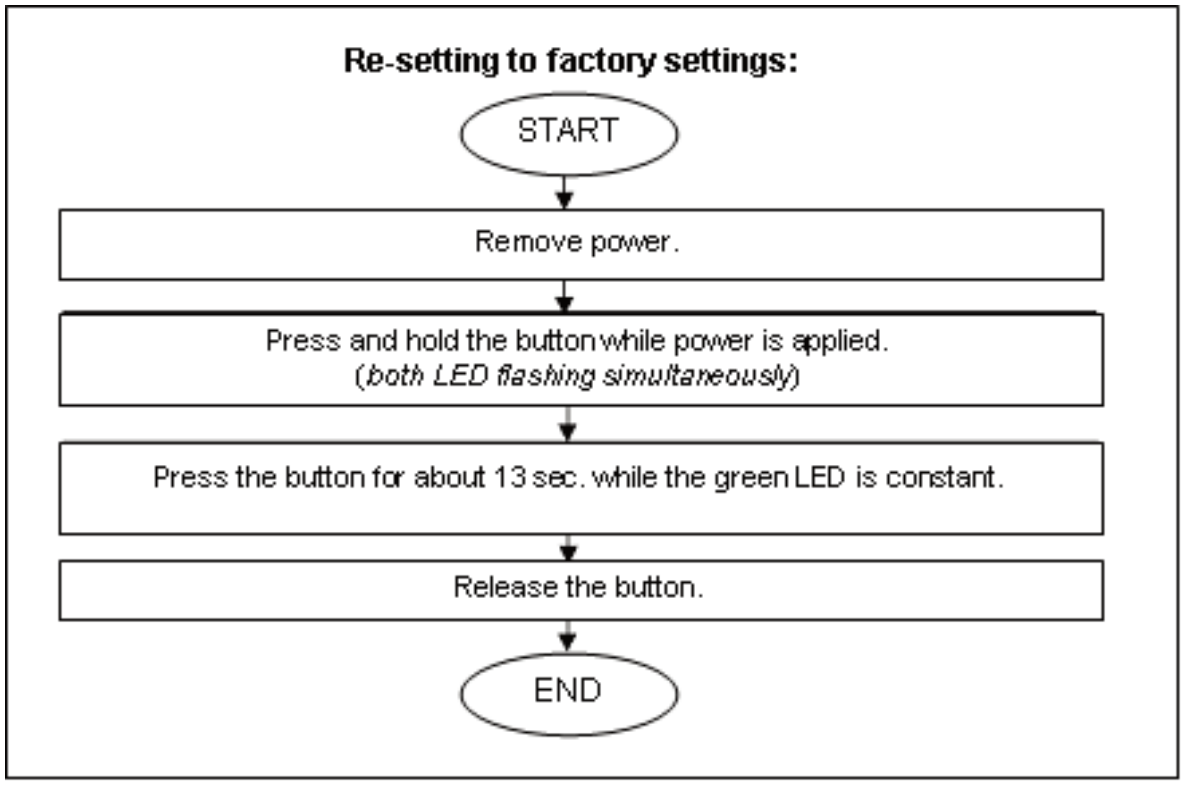
Output feature selection in ascending or descending:

START

Press the button for about 13 sec. until the LED blink simultaneously .
(Only *the green LED flashes*)

Press the button (for about 1 sec.) to choose between NA and NC.
Yellow LED: on= ascending
off= discending

Wait 10 sec.


Re-setting to factory settings:
START
Remove power.
Press and hold the button while power is applied.
(both LED flashing simultaneously)
Press the button for about 13 sec. while the green LED is constant.
Release the button.
END

9. PROBLEMS AND SOLUTIONS

Below is a diagnostic table showing the main faults, the probable causes and the possible solutions.
In the event of doubts and/or problems which cannot be solved, do not proceed to look for the fault by dismantling parts of the machine, but contact NTN-SNR Experts & Tools.

Fault	Cause	Solution
The electric pump is not delivering any lubricant	The electric motor is not functioning.	Check the connection between motor and electric supply line. Check the motor winding. Check that the connection plates for the motor terminal box are positioned in accordance with the supply voltage.
	The tank is empty.	Fill the tank. N.B.: If the tank was emptied without the electric signal for reaching the minimum level being given, the minimum level contact must be checked.
	The pump is not triggered. Causes of the pump failure to trigger: • The motor is turning in an inverted direction (clockwise); • The motor is turning in the right direction but the stirring paddle is not turning; • Presence of air bubbles in the lubricant. The pressure adjustment valve (bypass) has been calibrated at too low a value Presence of dirt in the non-return valve.	Remove the cover from the tank and check that the stirring paddle is turning anticlockwise and that the lubricant is moving; if not invert two of the three motor phases. See above. Remove the pump delivery pipe and drain off the lubricant until the air bubbles have been eliminated.

Fault	Cause	Solution
The pump will not build pressure.	Possible dirt on the cone of the pump stop valve Internal gasket between pumping element and manifold unit broken.	Clean the cone and the pumping element stop valve housing, draining off the lubricant. Replace the gasket.
No signal indicating minimum level when there is no lubricant in the tank.	Incorrect adjustment of minimum level.	Check the correct functioning of the level probe in the following way: Dismantle the minimum level unit and recalibrate the capacitive probe.
Selection of minimum level, with lubricant below the minimum and pump working.	Incorrect adjustment of minimum level.	The light on the control panel is still on: check the electric connection and, if necessary, replace the capacitive probe.
Lubrication installation accessories		
METERING UNIT AG6 Alarm signal indicating non-delivery of lubricant. The small rods visible inside the metering unit turrets must move sequentially up and down and activate the control microswitch when the pump is working. If this is not the case the two outlets or the single outlet of that metering unit will not deliver lubricant.	Metering unit small piston jammed. Piping between metering unit outlet and point requiring lubrication obstructed. Pressure on the line too low (the lubricant is not delivered by any outlet or only by a few outlets). Metering unit arranged for two outlets by used for only one outlet.	Replace the metering unit with another one having the same characteristics. However it is advisable to make sure that the metering units have been correctly assembled, particularly with regard to fixing. Over-locking of the fixing screws may damage the metering unit and cause the small piston to jam. Remove the outlet pipe and check to see if the metering unit is delivering lubricant. Change the pressure control valve adjustment (bypass) or the adjustment of the control pressure gauge (and of line) Check that, when one single outlet is used, the right pad is assembled and that the other outlet is sealed. See instruction sheet for AG6 metering units.
END OF LINE PRESSURE GAUGE The pressure gauge is not sending the signal to the electric command and control panel. The pressure gauge sends the signal before the end of the lubrication cycle.	Electrical connection incorrect. Incorrect adjustment of the control pressure gauge. The pressure value set is too high and the pressure adjustment valve (bypass) intervenes before the pressure gauge can be activated. Incorrect adjustment of the control pressure gauge. The pressure value set is too low.	Check the electrical connection. Reduce the pressure gauge calibration pressure until an electrical contact is obtained. Increase the pressure gauge calibration valve. The optimum calibration value is the one which allows a pressure of 50-70 bar (735 – 1029 psi) at the end of the lubrication line.

10. MAINTENANCE PROCEDURES

Use the individual protective devices needed to avoid contact with mineral oil or grease.

Regular inspection
The following regular checks must be carried out:

Check	
The lubrication status	1000 hours
Cleanliness of the loading and suction filter	4000 hours

The machine does not require any special equipment for any checking and/or maintenance activity, however the recommendation is to use suitable equipment which is in a good condition in order to avoid causing damage to persons or machine parts (according to current regulation).
If necessary clean the tank paying due attention (when the machine is off and without it being possible to restart it). Remember to reseal the tank once the operation has been completed.

Make sure that the electric and hydraulic supply has been disconnected before carrying out any maintenance intervention.

11. DISPOSAL

In the course of machine maintenance, or if the machine is scrapped, do not dispose of polluting parts into the environment. Refer to local regulations with regard to their correct disposal. When scrapping the machine the identification plate and any other documents must be destroyed.

12. INFORMATION ABOUT ORDERING

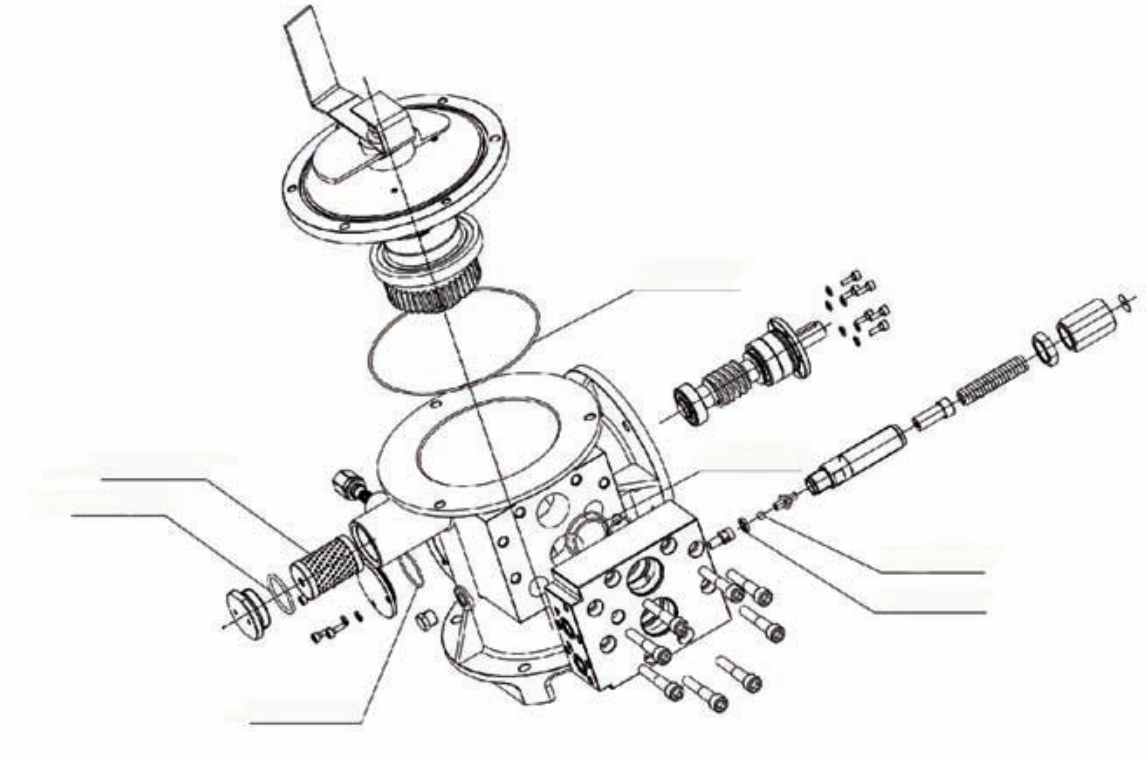
Standard equipment		
Equipment	**Description**	**Code**
Duo'Pulse Pump	400 cm3/min grease pump 30 Kg (66lb) tank with inverter at 24 V DC	
	400 cm3/min grease pump 100 Kg (220lb) tank with inverter at 24 V DC	
	400 cm3/min grease pump 80 Kg (176lb) transparent reservoir with inverter at 24 V DC	
	400 cm3/min oil pump 30 Kg (66lb) tank inverter at 24 V DC	
	400 cm3/min oil pump 100 Kg (220lb) tank with inverter at 24 V DC	
	DUO'PULSE ATEX Pump in Stainless Steel 316	
Duo'Pulse trolley mounted	Duo'Pulse Pump 30 Kg sheet metal reservoir with inverter at 24 V DC	
Electromagnetic inverter for base	24V DC 110V AC 50/60Hz 230V AC 50/60HZ	

Instrumentation and optional		
Equipment	**Description**	**Code**
Transparent reservoir	Reservoir, including the tank and all accessories required for use(flanges, screws, nuts, seals)	
Dual Line electric Inverter	24V DC 110V AC 50/60Hz 230V AC 50/60HZ	
Pneumatic inverter	24V DC 24V AC 50/60Hz 110V AC 50/60Hz 230V AC 50/60HZ	
Ultrasound level	Ultrasound level with continuous reading 4..20 mA	
Laser level	Laser level with 2 digital outlets with 4 thresholds or 4..20 mA	
Heater module	Heater module for low temperatures < –5°C (23° F)	
Pumping element modules	Reserve pumping module 200cm3/min (24 cu. in) Variable pumping module 100-200cm3/min (12-24 cu. in) Closure cap for fixed delivery pumping element Closure cap for variable delivery pumping element	
Oil conversion	Min/max oil level float kit 30 Kg (66lb) Min/max oil level float kit 100 Kg (99.79kg) Filling cap with filter	
Terminal Box bracket	Bracket for installing a terminal wiring box onto the base pallet	
Electrical control box Bracket	Bracket for installing a control box onto the base pallet	
Metal pallet	Metal Pallet used as the base of the packaging and also for installation of the pump.	

Spares description	Part number
Minimum level kit 30 kg (grease)	
Minimum level kit 100 kg (grease)	
Maximum level kit 30-100 kg (grease)	
Minimum and maximum laser level kit 30kg	
Minimum and maximum laser level kit 100kg	
Minimum and maximum ultrasound level kit 30kg	
Minimum and maximum ultrasound level kit 100kg	
Maximum mechanical level kit 30-100 kg (grease)	
Maximum and minimum float level kit 30 kg (oil)	
Maximum and minimum float level kit 100 kg (oil)	
Grease loading filter	
By-pass spare kit	
Manifold kit	
Tank flange gasket	
Manifold gasket (pump body)	
Manifold gasket (pumping)	
Filter gasket	
Filter cover gasket	
Wormskrew assembly cover gasket	
Body-pump reservoir gasket	
Helicoidal gear assembly	
Wormskrew assembly	

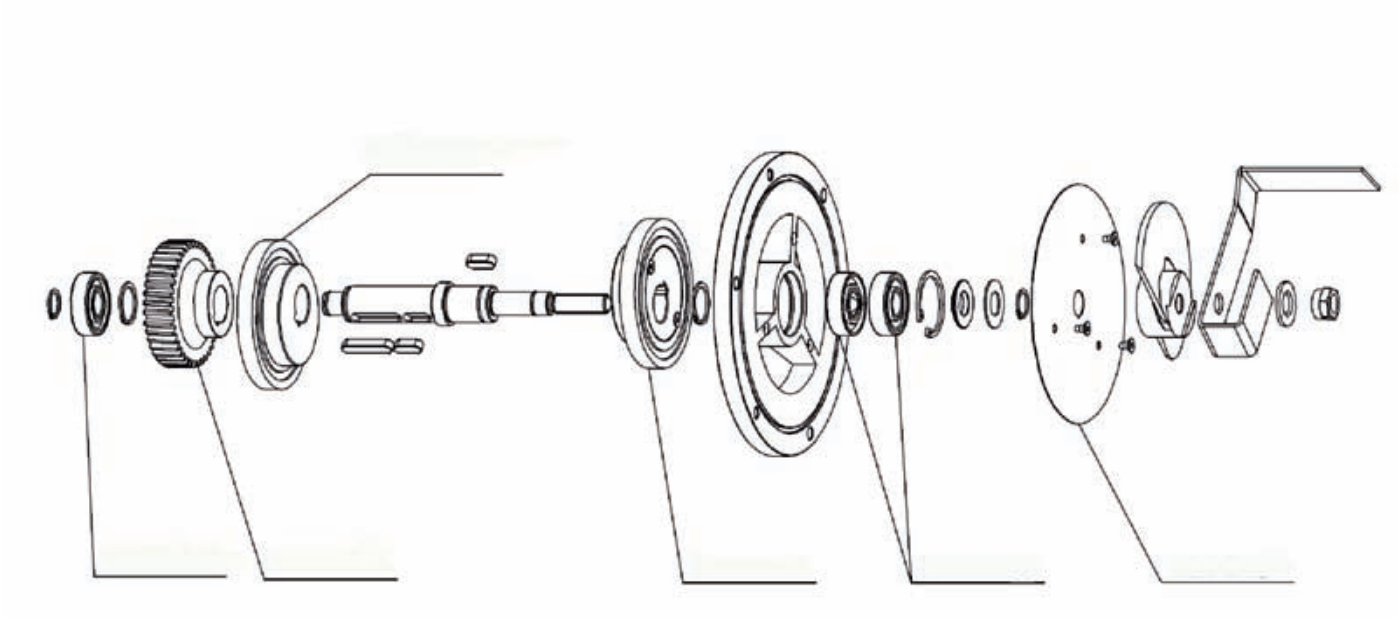
Pump body secondary unit

Drawing 9



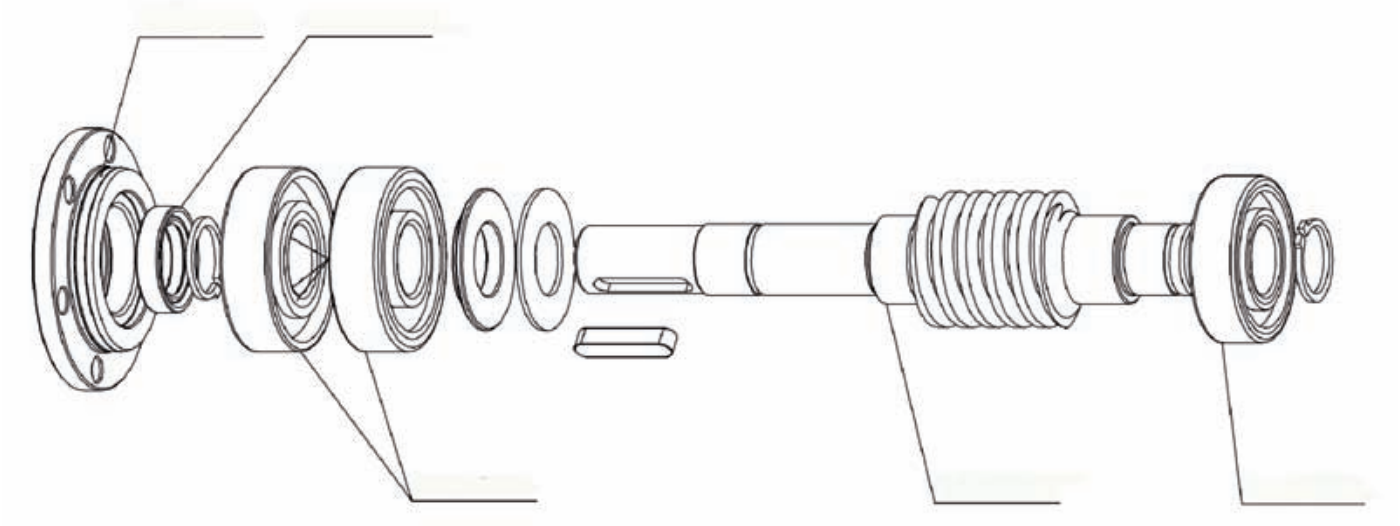
Worm wheel group unit

Drawing 10



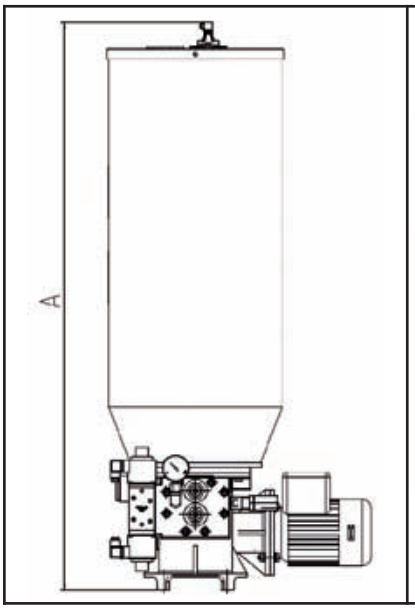
Endless screw unit

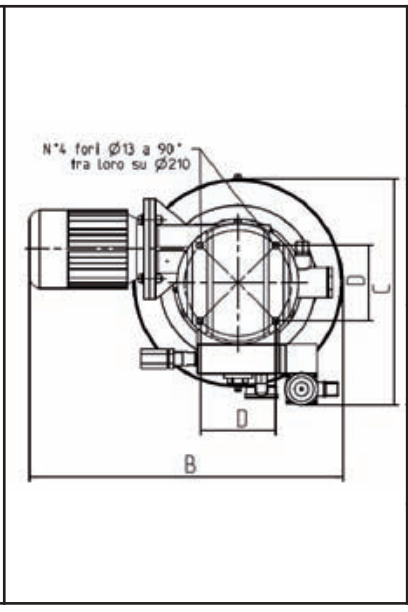
Drawing 11



13. DIMENSIONS

To facilitate future maintenance, leave at least 200 mm (7.87 in.) around these dimension.





Dimensions mm (inches)	
A	900 (35.43), 30 kg tank
	1350 (53.14), 100 kg tank
B	615 (24.21), 30-100 kg tank
C	450 (17.71), 30-100 kg tank
D	148.5 (5.84), 30-100 kg tank

Electric system – Technical data

Electrical supply:	230-400 Volt ± 5% 50 Hz 240-440 Volt ± 5% 60 Hz
Power absorbed:	0.75 kW

14. HANDLING AND TRANSPORT

A metal pallet is used for transport and storage with a wooden cover.
The pump is fixed on a metal pallet, which allows safe handling using a forklift. The metal pallet has been designed so that it can be mounted in the installation, being equipped with 4 (four) holes of Ø 14 mm suitable for fixing on the floor.
The machine components can withstand temperatures, during storage, from -20 to + 50 °C (-4°F - 122°F). To avoid damages for the machine, started up the machine, when it has reached a minimum temperature of +5 °C (+41°F).

15. PRECAUTIONS FOR USE

It is necessary to carefully read the warnings and risks associated when using a lubricant pump. The operator must understand how it works and must clearly understand the dangers by reading the user manual.
It is necessary to carefully read the warnings and the risks involved in using the lubrication panel. The operator must understand the functioning of the unit by studying the user's manual.

Electric currents
No intervention must be attempted on the equipment without first having disconnected the electrical power supply and ensuring that it cannot be reconnected during the intervention.
All installed equipment, electrical, electronic, tank and base structure, must be connected to the ground line utilizing the terminals fitted to each component.

Flammability
The oil employed in the lubrication circuit is not normally flammable. It is nonetheless indispensable to take every precaution against the oil coming into contact with very hot parts or open flames.

Pressure
Prior to any intervention on the equipment ensure that pressure is released from all branches of the lubrication circuit. Failure to do this could result in oil being discharged under pressure where connections or components are disassembled

Noise
The DUO'PULSE lubrication panel does not emit excessive noise, remaining below 70dB(A).
WARNING: before carrying out the replacement of the mini-pumps, empty the tank of lubricant.

16. CONTRAINDICATIONS FOR USE

The check for compliance with the essential safety requirements and with the guidelines indicated in the machine directives is to be carried out by means of compiling the checklists already made available and contained in the technical file.
Three types of lists were used:

•List of dangers (section from EN 414 relating to EN 292)
•Application of the essential safety requirements Machine Dir. - app. 1, part 1)
•Electrical safety stipulations (EN 60204-1)

See below a list of dangers which have not been completely eliminated, but are considered acceptable:

•During assembly/maintenance it is possible that there may be oil splash (consequently this operation must be carried out using appropriate individual protective devices);
•Contact with oil -> see instructions for using appropriate individual protective devices DPI;
•Use of an inappropriate lubricant -> fluid characteristics indicated both on the pump and in the manual (if in doubt consult our Technical Office);
•Protection against direct and indirect contact must be provided by the user;
•Whenever the cover is opened for an intervention resealing the is essential;
•The pump working logic requires to operate at all times, so it is necessary to pay attention to the electric connection. If there is no the power machine can only be restarted with a reset which restart automatically the lubrication pump.

Unacceptable fluids	
Fluids	**Dangers**
Lubricant with abrasive additives	High consumption of contaminated parts
Lubricant with silicon additives	Jamming of the pump
Benzine – solvents – inflammable liquids	Fire – explosion – damage to gaskets
Corrosive products	Corrosion of the pump – injuries to persons
Water	Pump oxidation
Food substances	Contamination of these substances

17. GUARANTEE

All products manufactured and marketed by NTN-SNR Roulements are warranted to be free of defects in material or workmanship for a period of at least 12 months from date of delivery.

Extension warranty coverage applies as follows if complete system installation by NTN-SNR Roulements: 12 Months.

If a fault develops, notify NTN-SNR giving:
- a complete description of the alleged malfunction
- the part number(s)
- test record number where available (format xxxxxx-xxxxxx)
- date of delivery
- date of installation
- operating conditions of subject product(s)

NTN - SNR Roulements reserves to right to charge an administration fee if the product(s) returned are found to be not defective.

This limited warranty does not cover any products, damages or injuries resulting from misuse, neglect, normal expected wear, chemically caused corrosion, improper installation or operation contrary to factory recommendation. Nor does it cover equipment that has been modified, tampered with or altered without authorization.

Consumables and perishable products are excluded from this or any other warranty.

No other extended liabilities are states or implied and this warranty in no event covers incidental or consequential damages, injuries or costs resulting from any such defective product(s).

The use of NTN-SNR product(s) implies the acceptance of our warranty conditions. Modifications to our standard warranty must be in made in writing and approved by NTN-SNR.

18. DECLARATION OF CONFORMITY

DECLARATION OF CONFORMITY

NTN-SNR Roulements, registered in Annecy, rue des Usines,

CERTIFIES :

that the machine DUO'PULSE pump

has been constructed in conformity with the DIRECTIVES OF THE COUNCIL OF THE EUROPEAN COMMUNITY on the standardization of the legislations of member states:

- 98/37/CE Machines

- BT 73/23/CEE Low voltage

has been manufactured, as applicable in accordance with the following standards and harmonised technical specifications: EN 292-1/2, EN 1050, EN 982, EN 11200, EN 60947, EN 894 1/2.

Annecy, July 2010

NTN-SNR Roulements

Christophe Oddoux,
General Manager Experts & Tools

Christophe Benier,
Product Manager Experts & Tools

Web site: http://www.ntn-snra.com - E-mail: expertsandtools@ntnsnr.com

Experts & Tools